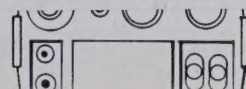


144MHz 10W MOBILE BOOSTER

IC-ML1

MAINTENANCE MANUAL

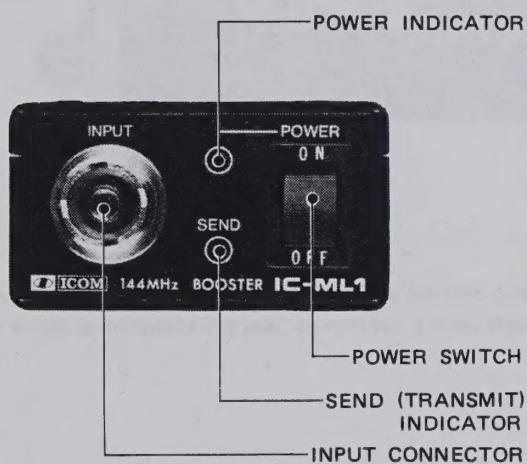


SPECIFICATIONS

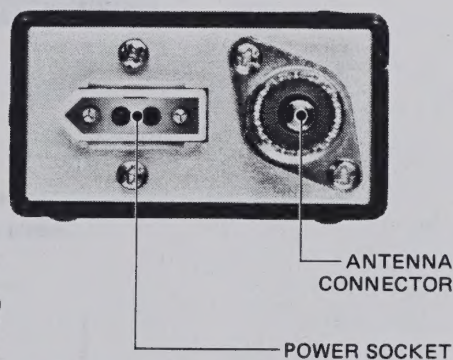
Number of Semiconductors	:	Transistors	6		
		Diodes	10		
		IC	1		
Frequency Coverage	:	144 ~ 148MHz			
Acceptable Modulation	:	FM			
Power Supply Requirements	:	13.8V DC \pm 15% Negative Ground 3A Max.			
Current Drain	:	Approx. 2.0A at 10W Output			
		Approx. 30mA at stand by			
Drive Power Requirements	:	2.3 Watts			
Output Power	:	10 Watts			
Input Impedance	:	50 Ω Unbalanced			
Output (Load) Impedance	:	50 Ω Unbalanced			
Dimensions	:	35mm(H) x 63mm(W) x 160mm(D)			
Weight	:	Approx. 320g			
Accessories	:	Power Cord	1	Gimp Screw	4
		Coaxial Cable	1	Flat Washer	12
		Fuse (5A)	2	Mounting Screw	8
		Mobile Mounting Bracket	1	Mounting Screw's Nut	4

PARTS DESIGNATION and CABLE CONNECTIONS

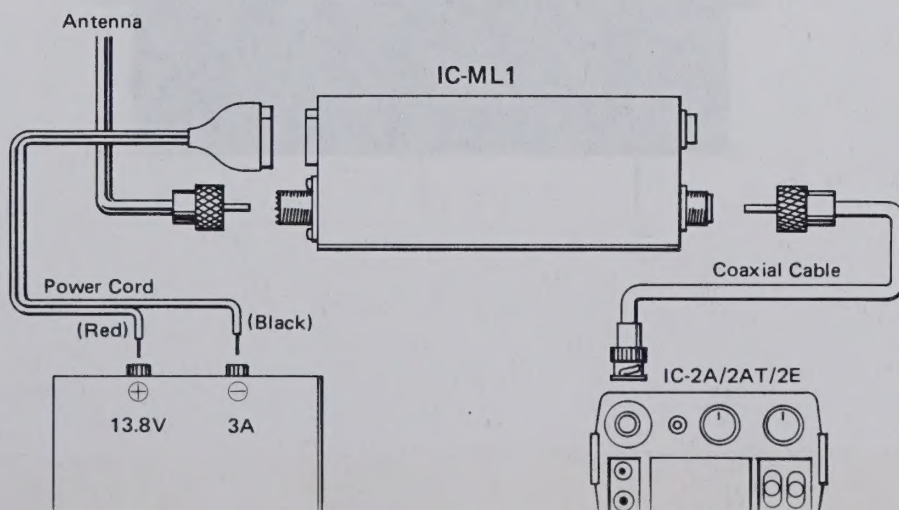
FRONT PANEL



REAR PANEL

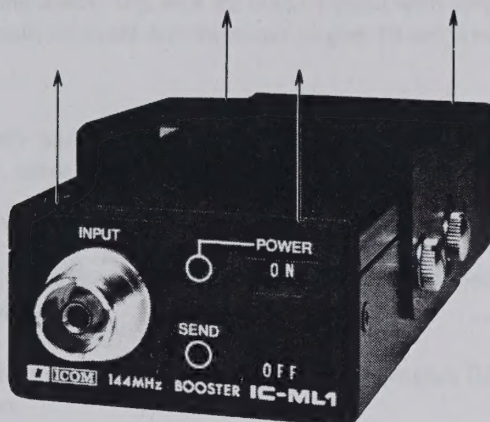


CABLE CONNECTIONS

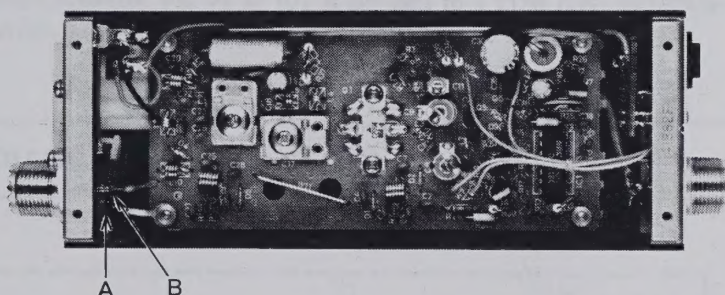


DISASSEMBLING

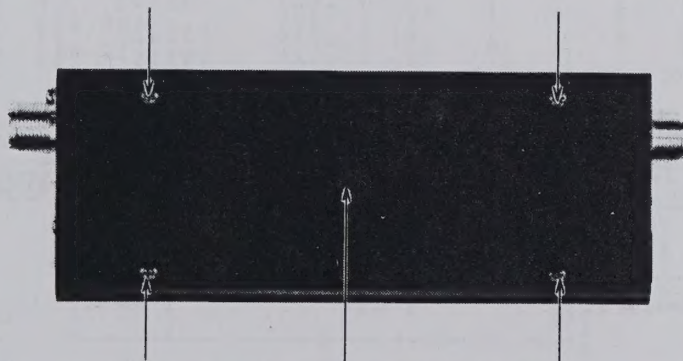
1. After removing the mounting bracket, remove the four screws which have retained the top cover.



2. When you wish to remove the P.C. board, resolder at A and B points as shown in the figure.



3. Remove the five screws which have retained the bottom cover.
The center screw is covered by a seal, so remove it then the screw.



CIRCUIT DESCRIPTION

POWER AMPLIFIER CIRCUIT

The 2.3 watts input from the transceiver are fed to the base of Q1 through T/R switching diode, D2, and after being amplified by Q1, and harmonics suppressed by an M-derived filter, applied to the external antenna through switching diode, D4, as a 10 watts output with very little spurious. C11 and R3 ~ R6 provided in the input circuit controls driving power to give 10 watts output.

DIRECT CIRCUIT

The transceiver is directly connected to the external antenna through L9, C28, C4 and L1, when the booster is switched OFF, when the APC circuit is activated, or when in the receive mode.

APC CIRCUIT

The APC circuit of this amplifier works only against over current because a final stage transistor of high puncture resistance is used.

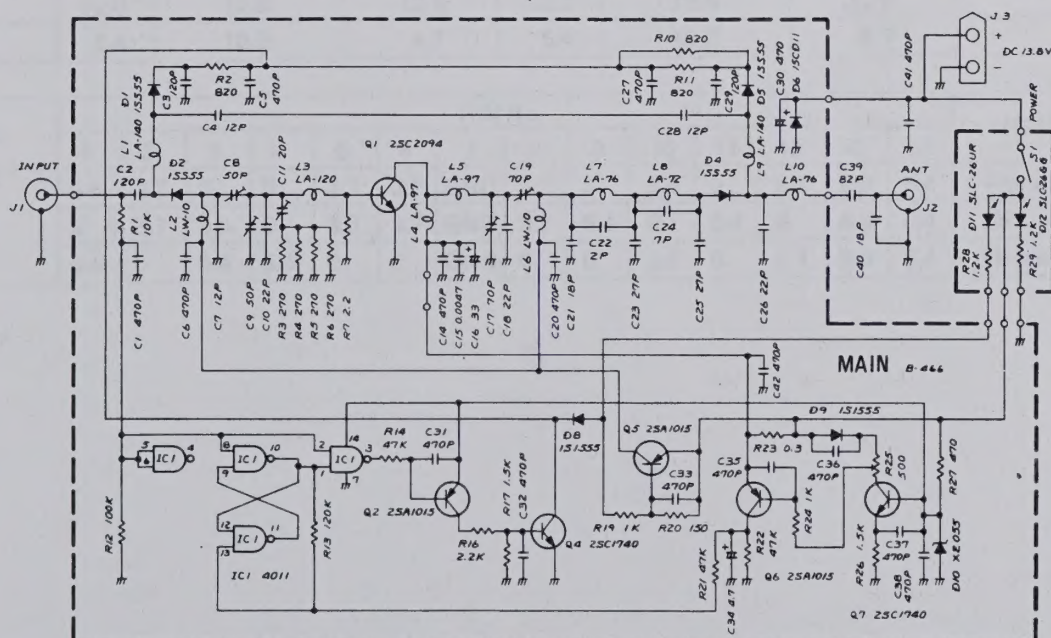
The voltage drop of R23 connected to the collector of Q1 switches Q6 and is applied to the APC control circuit to effect detection.

APC CONTROL, T/R SWITCHING CIRCUIT

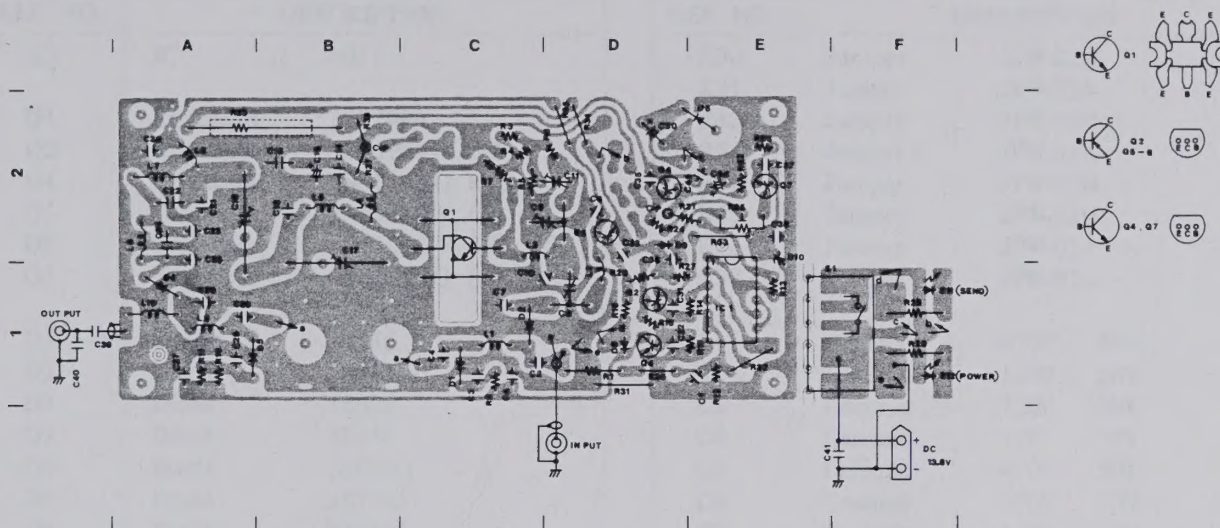
APC is controlled by a flip-flop composed of two sets of NAND gates. This is usually reset in the receive mode and Pin 10 of IC1 is brought to a HIGH level. In the transmit mode, Pin 3 of IC1 is brought to a LOW level, Q2, Q4, and Q5 are turned ON. Thus the T/R Switching diodes D2 and D4 are turned ON and the power amplifier circuit will work. At the same time, the SEND indicator LED is lit.

If the APC circuit operates, Pin 11 of IC1 is brought to a LOW level and Q4 is cut out, T/R Switching diodes D2, and D4 deactivate, causing a direct connection to the antenna.

SCHEMATIC DIAGRAM



P.C. BOARD LAYOUT



VOLTAGE CHARTS

NOTE: Measuring instrument is a 50K Ω /V multimeter.

TR No.	TRANSMIT			RECEIVE			REMARKS
	BASE	COLLECTOR	EMITTER	BASE	COLLECTOR	EMITTER	
Q1	-0.1	12.8	GND	0	13.8	GND	
Q2	4.7	5.3	5.4	5.0	0	5.4	
Q4	0.8	0.5	GND	0	13.8	GND	
Q5	13.0	13.8	13.8	13.8	0	13.8	
Q6	12.0	12.8	12.8	13.8	13.8	13.8	
Q7	5.4	10.2	4.7	5.4	10.2	4.7	

IC No.	PIN No.														REMARKS
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
IC1	5.4	3.7	0	0	3.7	3.7	GND	3.7	0	5.4	0	5.4	6.0	5.4	Transmit
	0	3.7	5.4	0	3.7	3.7	GND	3.7	5.4	0	5.4	0	6.0	5.4	APC actuates
	5.4	0	5.4	5.4	0	0	GND	0	0	5.4	0	5.4	6.0	5.4	Receive

PARTS LIST

REF. NO.	DESCRIPTION		
IC1	IC	4011	
Q1	Transistor	2SC2094	
Q2	Transistor	2SA1015-Y, GR	
Q4	Transistor	2SC1740-Q, R, S, E	
Q5	Transistor	2SA1015-Y, GR	
Q6	Transistor	2SA1015-Y, GR	
Q7	Transistor	2SC1740-Q, R, S, E	
D1	Diode	1SS55	
D2	Diode	1SS55	
D4	Diode	1SS55	
D5	Diode	1SS55	
D6	Diode	15CD11	
D8	Diode	1S1555	
D9	Diode	1S1555	
D10	Zener	XZ055	
D11	LED	SLC-26UR	
D12	LED	SLC-26GG	
L1	Coil	LA-140	
L2	Coil	LW-10	
L3	Coil	LA-120	
L4	Coil	LA-97	
L5	Coil	LA-97	
L6	Coil	LW-10	
L7	Coil	LA-76	
L8	Coil	LA-72	
L9	Coil	LA-140	
L10	Coil	LA-76	
R1	Resistor	10K	R25
R2	Resistor	820	ELR25
R3	Resistor	270	ELR25
R4	Resistor	270	ELR25
R5	Resistor	270	ELR25
R6	Resistor	270	ELR25
R7	Resistor	2.2	R25
R10	Resistor	820	ELR25
R11	Resistor	820	ELR25
R12	Resistor	100K	ELR25
R13	Resistor	120K	ELR25
R14	Resistor	47K	ELR25
R16	Resistor	2.2K	ELR25
R17	Resistor	1.5K	ELR25
R19	Resistor	1K	ELR25
R20	Resistor	150	ELR25
R21	Resistor	47K	R25
R22	Resistor	47K	ELR25
R23	Resistor	0.3	2W
R24	Resistor	1K	ELR25
R25	Trimmer	500	FR-10B
R26	Resistor	1.5K	ELR25
R27	Resistor	470	ELR25
R28	Resistor	1.2K	R25
R29	Resistor	1.2K	R25

REF. NO.	DESCRIPTION		
R30	Jumper	JPW-02H	
R31	Jumper	JPW-02A	
R32	Jumper	JPW-02H	
R33	Jumper	JPW-02A	
R34	Jumper	JPW-02H	
R35	Jumper	JPW-02H	
R36	Jumper	JPW-02A	
R37	Jumper	JPW-02A	
C1	Ceramic	470P	50V
C2	Ceramic	120P	50V
C3	Ceramic	120P	50V
C4	Ceramic	12P	50V
C5	Ceramic	470P	50V
C6	Ceramic	470P	50V
C7	Ceramic	12P	50V
C8	Trimmer	CVE50-41	
C9	Trimmer	CVE50-41	
C10	Ceramic	22P	50V
C11	Trimmer	CVO5D2001	
C14	Ceramic	470P	50V
C15	Ceramic	0.0047 μ	50V
C16	Electrolytic	33 μ	16V
C17	Trimmer	C-1P-2	
C18	Ceramic	22P	50V
C19	Trimmer	C-1P-2	
C20	Ceramic	470P	50V
C21	Ceramic	18P	50V
C22	Ceramic	2P	50V
C23	Ceramic	27P	50V
C24	Ceramic	7P	50V
C25	Ceramic	27P	50V
C26	Ceramic	22P	50V
C27	Ceramic	470P	50V
C28	Ceramic	12P	50V
C29	Ceramic	120P	50V
C30	Electrolytic	470 μ	16V
C31	Ceramic	470P	50V
C32	Ceramic	470P	50V
C33	Ceramic	470P	50V
C34	Electrolytic	4.7 μ	35V
C35	Ceramic	470P	50V
C36	Ceramic	470P	50V
C37	Ceramic	470P	50V
C38	Ceramic	470P	50V
C39	Ceramic	82P	50V
C40	Ceramic	18P	50V
C41	Ceramic	470P	50V
C42	Ceramic	470P	50V
	P.C. Board	B-466B	
J1	Connector	MRB	
J2	Connector	F.M-M. DRMI	
J3	Connector	1490-4P	
S1	Switch	SDJ2S	

